

### Weight Change

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Weight loss is one of the most common symptoms associated with malignancies.

### CANCER

Eighty percent of cancer patients in advanced stages experience weight loss and as many as 40% report weight loss at the time of initial presentation. Weight loss in a cancer patient is particularly concerning and indicates severe malnutrition if there is greater than 2% weight loss per week, 5% or more weight loss in the previous month, 7.5% or more weight loss over the previous 3 months, or 10% or more weight loss over the previous 6 months.

Weight loss in cancer patients is important because it may result in poor response to cancer treatments, increased predisposition to secondary infections, poor prognosis, and shorter survival times.

#### Symptoms

- Cachexia
- Anorexia +++++
- Fatigue
- Mood disturbances

#### Signs

- Decreasing serial body weights
- Muscle wasting
- Dehydration
- Anemia

#### Workup

- CBC
- Serum albumin
- Serum prealbumin
- Serum cholesterol
- BUN
- Creatinine
- Electrolytes
- Glucose

## Comments and Treatment Considerations

Treatment options for treating weight loss in cancer patients include increasing protein intake. To maintain lean body mass cancer patients require at least 1.5 to 2.0 g of protein/kg daily. Isoleucine, valine, and leucine (branched chain amino acids [BCAAs]) are particularly effective in increasing lean body mass. Ideal sources of protein include lean fish and chicken. Whey-based protein powders may be used to supplement meals.

Dietary modifications should also be encouraged. Eat small, frequent meals. Keep snacks such as ice cream within easy access. Include foods in meals that the patient enjoys the most. Eat more when one feels the hungriest. Drink liquids such as juices if unable to tolerate solids. Try cool or frozen foods/beverages.

Consume omega-3 fatty acids. Fish oils are rich in omega-3 fatty acids especially eicosapentaenoic acid (EPA). Significant increases in lean body mass and weight gain have been noted in studies using EPA. Omega-3 fatty acids are readily available as OTC supplements.

Consider using medications such as ondansetron, dolasetron, granisetron or aprepitant to not only treat nausea and vomiting but also prevent it.

Steroids act by inhibiting the synthesis of cytokines, decrease nausea, and improve appetite. However, most studies have demonstrated beneficial effects of steroids up to 1 month only. Extended use of steroids can lead to osteoporosis, immunosuppression, glaucoma, and psychiatric side effects.

Megestrol in a dosage of at least 320 mg/day orally has successfully produced weight gain in cancer patients. Megestrol use has been associated with decreased cytokine levels in some studies. Patients are usually started on a dosage of 160 mg daily in divided doses. The daily dose can be increased to 800 mg daily depending on the clinical response.

Weight gain might even be noticed after megestrol is stopped. Side effects include edema, constipation, and delirium. Megestrol is also associated with an increased incidence of thromboembolic events. Megestrol should not be used in patients with heart disease or thromboembolic disease.

Cyproheptadine has antihistaminic properties and has been shown to increase appetite in cancer patients. A controlled trial showed that cyproheptadine increased appetite in cancer patients although it did not decrease weight loss. Side effects include drowsiness and dizziness.

Dronabinol is a synthetic version of tetrahydrocannabinol (THC), the active ingredient in marijuana. Side effects include somnolence, confusion, and dizziness. Megestrol is more effective than dronabinol.

Depression plays a significant role in cancer-related weight loss. Mirtazapine (Remeron), an atypical antidepressant, has been shown to treat depression and induce weight gain.

Oxandrolone, ornithine, and anabolic steroids may be used to increase lean body mass in cancer patients. Somatotropin (recombinant human growth hormone) may also be considered to treat wasting syndromes.

Consider tube feeding or TPN for patients in whom these measures are ineffective. Addition of BCAAs to TPN significantly improves albumin synthesis. Percutaneous endoscopic gastrostomy (PEG) or J-tubes are surgical alternatives in patients in whom medical therapy has failed and no surgical contraindications exist.

Exercise helps to rebuild lost lean body mass. Exercise options include doing gentle weight training such as lifting light weights several times a day and low-impact aerobic exercise such as walking.

Thalidomide, pentoxifylline, interleukin 15 (IL-15), antimyostatin antibodies, ghrelin, and ubiquitin ligase inhibitors are some of the other treatment modalities currently being investigated for treatment of weight loss in cancer.

## EATING DISORDERS

Eating disorders are behaviors characterized by abnormal eating patterns, cognitive distortions related to food and weight, and have adverse effects on health status and function. More than 5 million Americans suffer from eating disorders with a female-to-male ratio of 5:1.

Eating disorders are the third most common chronic illness in adolescent women. Over the past decade there has been a documented increase among American female adolescents in eating and weight-related problems and unhealthy weight control practices such as self-induced vomiting; laxative, diuretic, and diet pill misuse; and excessive exercise.

Types of eating disorders according to the DSM-IV include:

- Anorexia nervosa (AN): voluntary restriction of caloric intake accompanied by the obsession to be thinner and the delusion of being fat
- Bulimia nervosa (BN): voluntary episodes of ingesting large amounts of food followed by “purging” behavior (i.e., exercise, diuretics/laxatives, vomiting, fasting)
- Binge eating disorder
- Compulsive eating disorder

### Symptoms

- Amenorrhea
- Cold intolerance
- GI problems
- Lack of energy
- Depression +++

### Signs

- Weight loss or failure to gain weight (in AN: BMI  $\leq 17.5$ ) +++++
- Weight fluctuations (especially in BN)
- Osteoporosis
- Dysrhythmias
- Hypotension
- Hypothermia

- Electrolyte abnormalities
- Dry skin
- Hair loss

### Workup

- Screening questions
  - Has there been any change in your weight?
  - How do you feel about your appearance?
  - What did you eat yesterday?
  - How much do you exercise in a typical week?
  - Have you ever used laxatives, vomiting, or medications to lose weight or compensate for overeating?
- BMI and weight documentation
- Initial assessment should focus on exploration of the underlying factors.
- Is weight loss intentional and desired or related to an organic process?
- Are weight-control habits excessive or unhealthy?
- What is the patient's desired goal weight?
- Record energy intake
  - Seven-day food diary
- Labs: focus on detecting underlying medical conditions
  - Thyroid disease—TSH
  - Diabetes—Fasting blood sugar (FBS)
  - Anemia—CBC with differential

### Comments and Treatment Considerations

The four elements of successful treatment include recognizing the disorder and restoring physiologic stability early in its course; establishing a trusting, therapeutic relationship with the patient; involving the family in treatment; and using an interdisciplinary team approach to include family, psychiatrist/psychologist, nutritionist, school officials, physician, and dentist.

Pharmacotherapy: SSRI (fluoxetine) is used in both BN and AN.

## FAILURE TO THRIVE

Failure to thrive (FTT) is diagnosed within the first 2 years of life in an infant or child whose physical growth is significantly less than that of his or her peers. FTT is often divided into two categories: organic failure to thrive (OFTT) and nonorganic failure to thrive (NOFTT).

OFTT implies an illness resulting in FTT. Organic FTT is marked by an underlying medical condition (Table 45-1).

NOFTT indicates a psychosocial issue (includes child abuse and neglect, behavioral issues) resulting in FTT. NOFTT is the most commonly seen in primary care.

### Signs

- Weight below 5th percentile on more than one occasion ++++
- Low weight for height

**Table 45-1. Underlying Medical Conditions Causing Organic Failure to Thrive**

SYSTEM	CAUSES
Gastrointestinal	Gastroesophageal reflux, celiac disease, pyloric stenosis, cleft palate/cleft lip, lactose intolerance, Hirschsprung's disease, milk protein intolerance, hepatitis, cirrhosis, pancreatic insufficiency, biliary disease, inflammatory bowel disease, malabsorptions
Renal	Urinary tract infection, renal tubular acidosis, diabetes insipidus, chronic renal insufficiency, acute renal insufficiency
Cardiopulmonary	Cardiac diseases leading to congestive heart failure, asthma, bronchopulmonary dysplasia, cystic fibrosis, anatomic abnormalities of the upper airway, obstructive sleep apnea, chronic aspiration, respiratory insufficiency
Endocrine	Hypothyroidism, diabetes mellitus, adrenal insufficiency or excess, parathyroidism disorders, pituitary disorders, growth hormone deficiency
Neurologic	Mental retardation, cerebral hemorrhages, degenerative disorders, cerebral palsy
Infectious	Parasitic or bacterial infections of the gastrointestinal tract, tuberculosis, HIV, or AIDS
Metabolic	Inborn errors of metabolism
Congenital	Chromosomal abnormalities, congenital syndromes (fetal alcohol syndrome), perinatal infections, congenital immunodeficiency syndromes, cleft palate
Miscellaneous	Lead poisoning, malignancy, collagen vascular disease, recurrently infected adenoids and tonsils, prematurity, low birthweight

*AIDS*, Acquired immunodeficiency syndrome; *HIV*, human immunodeficiency virus. Adapted from Behrman R, Kliegman R, Jenson H: *Pocket companion to accompany Nelson textbook of pediatrics*, 2nd ed, Philadelphia, 2001, Saunders.

- Diminished rate of weight gain so that there is a decrease in weight of two or more major percentile categories over time
- Weight less than 80% of ideal weight for age on standard growth charts
- Rate of daily weight gain less than expected for age

### Workup

- FTT evaluation should include assessing the following four dimensions of the child and family: medical, nutritional, developmental or behavioral, and psychosocial.

- Most infants with FTT secondary to malnutrition resulting from inadequate caloric intake, malabsorption, or altered metabolism, typically have normal head circumference, and weight is reduced out of proportion to height.
- Laboratory examination for suspected FTT should be based on history and physical examination findings. Basic laboratory studies to be obtained in all or most cases should include:
  - CBC
  - Electrolytes and kidney functions
  - Tuberculin skin test
  - Urinalysis and culture
  - Stool studies for *Giardia* antigen.

Further studies, such as a radiologic bone age may be considered, especially if indicated by history or physical examination.

### Comments and Treatment Considerations

Whether the cause of FTT is organic or nonorganic, establishing an appropriate feeding atmosphere at home is important. Children with severe malnutrition must be re-fed carefully to avoid potential complications. For children with organic FTT, the underlying medical condition should be treated.

Outpatient treatment of FTT includes weekly visits to check weight, height, head circumference, and physical assessment until weight has reached the 5th percentile. Schedule monthly visits until adequate weight and height gain have been achieved and maintained for at least 3 consecutive months.

Support parents with referral to the Women, Infants and Children (WIC) program, nutritionist, social worker, Medicaid office, and support groups, as needed. Involve mental health professionals for families with concerns of psychologic or psychiatric disorders, substance abuse, or family dysfunction.

Indications for hospitalization include severe malnutrition, need for further diagnostic laboratory evaluation, and lack of catch-up growth, despite outpatient treatment.

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